



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,514	01/27/2004	Barrie Gilbert	1482-177	2219
20575	7590	05/16/2005		
MARGER JOHNSON & MCCOLLOM, P.C. 1030 SW MORRISON STREET PORTLAND, OR 97205			EXAMINER NGUYEN, MINH T	
			ART UNIT	PAPER NUMBER
			2816	

DATE MAILED: 05/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/766,514

Applicant(s)

GILBERT, BARRIE

Examiner

Minh Nguyen

Art Unit

2816

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 22 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 12-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 28-31 is/are allowed.
- 6) ☒ Claim(s) 12,13,15,17,19,21,22 and 24-26 is/are rejected.
- 7) ☒ Claim(s) 14,16,18,20,23 and 27 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2/22/05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. Applicant's amendment filed on 2/22/05 has been received and entered in the case. Claims 12-31 are pending. The amendment and argument presented therein overcome the informality objections, indefiniteness rejections and double patenting rejections, and therefore, these are withdrawn. The prior art rejections of some claims are remained and repeated for the reasons set forth below. This action is FINAL.

#### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 12-13, 15 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 5,909,136, issued to Kimura.

As per claim 12, Kimura discloses a squaring cell (Fig. 5) comprising:

a first sub-exponential current generator (the combination of Q1, Q2, Q5-Q9 and current source 31) for generating a first current (the current at the collector of Q9, the limitation "sub-exponential" is met because formula 17 shown in column 8 is merely the approximation of the

Art Unit: 2816

first current, see column 8, lines 3-6, i.e., Kimura assumes current gain factor is 1 (which is not) when deriving formula 17) responsive to an input signal  $V_i$  (at nodes 11 and 12); and

a second sub-exponential current generator (the combination of Q3-Q4, Q10-Q14 and current source 32) for generating a second current (at the collector of Q14) responsive to the input signal  $V_i$ ;

wherein the first and second sub-exponential current generators are coupled together (at node 13) to combine the first and second currents.

As per claim 13, Kimura further discloses each of the sub-exponential current generator includes:

a constant current stack (transistors Q1 and current source 31, i.e., Q1 and current source 31 are stacked and current source 31 has constant current  $I_0$ ) coupled to a first input terminal 11; and

a variable current stack (Q2 and Q5 are stacked and the current through Q2 is not constant) coupled to a second input terminal 12 and the constant current stack (Q1 and Q2 are connected).

As per claim 15, this claim is merely a method to operate the squaring cell having elements and connections discussed in claim 12 above. Since Kimura teaches the circuit, he inherently teaches the recited method.

As per claim 19, the same rejection as discussed in claim 12, and further, since Kimura discloses  $I_0$  is programmable parameter (column 8, line 58), he inherently discloses the recited limitation which is altering the first and second currents. The recited limitation is also met since

Art Unit: 2816

the input voltage VI is not a constant voltage. Also, since the first and second currents are altered, the exponential functions are modified.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 17, 21-22 and 24-26 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US Patent No. 5,909,136, issued to Kimura.

As per claim 17, Kimura discloses steps for squaring a signal as discussed in claim 12, and further, Kimura explicitly discloses I0 is programmable parameter (column 8, line 58). In other words, he discloses I0 can be scaled in response to a control signal so that the first and second currents are scaled.

Kimura does not explicitly disclose the step of scaling is performed while generating and combining the first and second currents. In other words, Kimura does not explicitly disclose the step of programming the current I0 is performed when the circuit is operating.

However, as understood by a person skilled in the art, the ability of programming or making a change of a parameter in a circuit when the circuit is operating is desirable feature because the circuit does not need to be powered down.

It would have been obvious to one skilled in the art at the time of the invention was made to perform the step of scaling in the Kimura circuit while the circuit is operating to save the time needed to power down the system.

As per claim 21, Kimura discloses a multiplier (Fig. 1) comprising:

a first exponential current generator (Fig. 1, box 1, Fig 5 is the detail, transistors Q1, Q2, Q5-Q9, current source 31) for generating a first current (at the collector of Q9) responsive to a first input signal  $V_x$  and second input signal  $-V_y$ ;

a second exponential current generator (Fig. 1, box 1, Fig. 5 is the detail, transistors Q3-Q4, Q10-Q14, current source 32) for generating a second current (at the collector of Q14) responsive to the first input signal  $V_x$  and second input signal  $-V_y$ ;

a third exponential current generator (Fig. 1, box 2, Fig. 5 is the detail, transistors Q1, Q2, Q5-Q9, current source 31) for generating a third current (at the collector of Q9) responsive to the first input signal  $V_x$  and a third input signal  $V_y$ ;

a fourth exponential current generator (Fig. 1, box 2, Fig. 5 is the detail, transistors Q3-Q4, Q10-Q14, current source 32) for generating a second current (at the collector of Q14) responsive to the first input signal  $V_x$  and a third input signal  $V_y$ ;

wherein the first and second sub-exponential current generators are coupled together (at node 13) to combine the first and second currents.

wherein the third and fourth exponential current generators are coupled together (at node 13) to combine the third and fourth currents.

Kimura does not explicitly disclose each of the exponential current generators responsive to specific input signals as called for in the claim.

However, it is clear from the Kimura's specification that an exponential current generator generates an output current which is exponential to the difference between the input signals applied to its inputs.

It would have been obvious to one skilled in the art at the time of the invention was made to apply specific input signals to each of the four Kimura's exponential current generators as called for in the claim.

The motivation/suggestion for doing so would have been obvious since a skilled artisan knows that the Kimura's multiplier is capable of multiplying any input signals which includes input signals specifically called for in the claim.

As per claim 22, this claim is rejected for the reason discussed in claim 13.

As per claim 24, the combination discussed in claim 21 teaches the structure, the method to operate such structure is seen as obvious.

As per claim 25, the steps of combining are performed at nodes 13 shown in Fig. 1.

As per claim 26, rejected for the same reason and motivation discussed in claim 17.

### ***Response to Arguments***

4. Applicant's arguments filed 2/22/05 have been fully considered but they are not persuasive.

Regarding the argument that Kimura does not disclose a sub-exponential current generator as required by the claim. Kimura does not disclose any structure for deliberately changing the exponential function of an exponential current generator.

As discussed in the preceding rejection, Kimura teaches that transistors used in the exponential current generator circuits do not have exactly the same geometry, the exponential current generator circuits do not generate ideal exponential functions. In other words, the Kimura's exponential current generator circuits are sub-exponential current generator circuits. Claim 12 requires the exponential current generators generate sub-exponential functions, the Kimura's exponential current generators generate sub-exponential functions as discussed above, the recited limitation is met. The act of "deliberately" is irrelevant because the claim only requires the exponential current generator circuits generate sub-exponential functions, and the Kimura's exponential current generators clearly generate sub-exponential functions.

Regarding the argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning.

The examiner notes that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In this instant case, one skilled in the art clearly recognizes the advantage of programming the current source without the need to power down the system as discussed.

In response to applicant's argument that the present invention main points of scaling the current during circuit operation is to provide additional signal input that allows the circuit to operate as both as squaring cell and a multiplier.



Art Unit: 2816

The examiner notes that the fact that the applicant has recognized another advantage cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

***Allowable Subject Matter***

5. Claims 14, 16, 18, 20, 23 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 14 is allowable because the prior art of record fails to disclose or suggest the inclusion of a back-bias component in each of the sub-exponential current generators. The inclusion of the back-bias component in each of the sub-exponential current generators defines patentability over the prior art of record because they define a distinguished structure of the squaring cell which is not taught by the art of record, alone or in combination and further they provide the advantage of reducing the standing current as specifically disclosed in page 23, lines 5-6.

Claims 16, 18, 20, 23 and 27 are allowable for the same reason noted in claim 14.

6. Claims 28-31 are allowed.

Claims 28-29 are allowed because the prior art of record fails to disclose or suggest the inclusion of a resistor coupled between the node and the current source as recited in claim 28. The inclusion of the resistor located as recited in each of the exponential current generators

Art Unit: 2816

defines patentability over the prior art of record because it defines a distinguished structure of the squaring cell which is not taught by the art of record, alone or in combination.

Claims 30-31 are allowed for the same reason noted in claim 28.

### ***Conclusion***

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

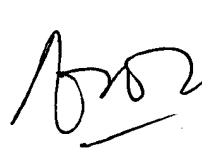
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh Nguyen whose telephone number is 571-272-1748. The examiner can normally be reached on Monday, Tuesday, Thursday, Friday 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Callahan can be reached on 571-272-1740. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2816

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



5/10/05

Minh Nguyen  
Primary Examiner  
Art Unit 2816